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**HORIZONTAL FORM FILL AND SEAL PACKING**  
**METHOD FOR RECLOSABLE PACKAGES**

**FIELD OF THE INVENTION**

- 10           The present invention relates to plastic bags of the type in which perishable food products and other goods are packaged for sale to consumers in retail outlets. More specifically, the present invention relates to a machine for and a method of producing plastic bags which are concurrently manufactured and filled with product on a Horizontal Form-Fill-and-Seal (HFFS) machine, wherein a plastic interlocking zipper is disposed
- 15   between the product and at a fold of the packaging film is used to form a three-sided sealed package.

**DESCRIPTION OF THE PRIOR ART**

- 20           The present invention relates to improvements in the package-making art and may be practiced in the manufacture of thermoplastic bags and packages of the kind that may be used for various consumer products, but which are particularly useful for food products which must be kept in moisture-tight and air-tight packages, free from leakage until initially opened for access to the product contents, of which the packages are reclosable with a zipper means protecting any remainder of the product therein.
- 25           The indicated art is fairly well-developed but nevertheless remains open to improvements contributing to increased versatility and efficiency. In the prior art, Malin et al. (U.S. Patent No. 6,185,907) discloses a horizontal form-film-and-seal (HFFS) machine, wherein a continuous length of packaging film is folded lengthwise over the consumer products to be packaged and the edges are aligned. A zipper is fed between the
- 30   aligned edges of the packaging film. The edges are sealed to one another, and the zipper sealed to the folded packaging film, by a pair of parallel sealing devices. Side seals are

produced by conventional means, which also separate the completed packages from the packages being formed.

A limitation to the above method is that when the length of packaging is folded over the consumer product, the zipper can be fed only near the edges of the packaging film. A significant expansion of the capability of the above method and other methods utilizing horizontal sealing would be to place a zipper on the interior of the bag close to the lengthwise fold. This placement of the zipper would allow an alternative three-sided sealing of the product while maintaining an available reclosable zipper. An aperture and/or a weakness area, such as a scoring line, may be provided to create a tearing area for access to the zipper.

### SUMMARY OF THE INVENTION

Accordingly, the present invention is a machine for and a method of packaging consumer products wherein a zipper is placed between the product and a film fold of supplied packaging film. In the HFFS machine of the present invention, a continuous length of packaging film having two longitudinal edges is provided. Consumer products are placed at intervals along one half of the continuous length of packaging film. A continuous supply of zippers with sliders attached is disposed between the center of the continuous length of packaging film and the consumer products. The continuous length of packaging film is folded down the center and over upon the consumer products and the continuous supply of zippers. The longitudinal edges of the folded film are aligned. The zippers are sealed to the film and the aligned longitudinal edges of the film are sealed to each other. The film is sealed crosswise at intervals between the consumer products to create individual packages. The packages, each including an individual zipper length, are separated from the packages being formed. An aperture and/or a weakness area, such as a single or a plurality of scoring lines, is provided to create a tearing area for access to the zipper or to provide an ability to remove the film surrounding a slider on the zipper.

Such an access or the ability to remove the film surrounding the slider may be provided for the convenience of the package user.

### DESCRIPTION OF THE DRAWINGS

5 Further objects and advantages of the invention will become apparent from the following description and claims and from the accompanying drawings, in which:

Figure 1 is a top schematic plan view of the horizontal form-fill-and-seal machine depicting the machine of the present invention;

Figure 2 is a sectional view depicting the fold-guide and roller of the present  
10 invention with the view taken from reference line 2-2 of Figure 1;

Figure 3 is a top view of the completed bag of the present invention;

Figure 4 is a sectional view depicting the weakness areas of the present invention with the view taken from reference line 4-4 of Figure 3; and

Figure 5 is a sectional view depicting the weakness areas of the present invention  
15 with the view taken from reference line 5-5 of Figure 3.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, wherein like numerals indicate like elements throughout the several views, a top view for the HFFS machine 10 is shown in  
20 Figure 1. A continuous length of packaging film 12 is dispensed flat from a supply roll 14 downward under a guide roll 16 and toward a fold-guide 17. The fold-guide 17 and rollers 18 fold the packaging film 12 lengthwise down the middle of the film. The fold-guide 17 raises portion 22 of the packaging film 12 being folded over and upward relative to the portion 24 of the film lying flat on the HFFS machine 10. Also see Figure 2.

25 An interlocked zipper 26 with a slider 27 is fed and continuously guided via guide 28 to a lengthwise area proximal to the lengthwise fold 29 of the film. The zipper with slider may be supplied for feeding to the HFFS machine by a vertical or a horizontal supplying device 30. End stops 31, 32 for the ends of the zipper sections for the

individual bags to be formed are provided by an end stop inserter 33. As shown in the figure, the end stop inserter 33 may be located before or after a slider insertion. If the zipper 26 with the slider 27 is not provided by the supplying device 30, the supplying device 30 may provide only an interlocked zipper with a slider insertion provided

5 between each pair of end stops by slider insertion apparatus 34.

Simultaneous with or after the placement of the interlocked zipper 26, a product 35 to be packaged is placed by a product dispenser 36 on the portion 24 on or near the folding member 17. After the consumer product and the zipper are fed to the packaging film, the fold-guide 17 and rollers 18 serve to continuously fold portion 22 of the  
10 packaging film 12 over and onto portion 24. Also see Figure 2.

Ultimately the two longitudinal film edges 40, 42 are brought into alignment with each other at an indented roller 43. After the folding operation is complete, the zipper 26 with slider 27 and the product 35 are covered by portion 22. The indented roller 43 is shaped to avoid crushing the consumer product 35 and the slider 27.

15 Downstream of the fold-guide, and when the two longitudinal edges are brought into alignment, a sealing operation is performed by sealing section 46 and zipper sealing section 48. The sealing sections may be of the type typically used in the art. For example, the sealing sections may include opposing sealing bars surrounded by belts that prevent sticking of the film to the sealing bars. The sealing section 46 seals the  
20 longitudinal film edges 40, 42. The zipper sealing section 48 seals the zipper 26 to portions 22 and 24; however, the zipper sealing section 48 is adjusted to avoid the slider 27 during the sealing operation.

Finally, downstream of the sealing section 46 and the zipper sealing section 48 is the cut-off device 52. The cut-off device 52 cross-seals the trailing edge 54 of the  
25 completed bag 55 (shown in Figure 3) and forms an end seal 56 while simultaneously separating the completed bag from the HFFS machine. The cut-off device 52 also seals the leading edge of the section of film being sealed at sealing sections 46, 48, with the cut-off device 52 forming an end seal 57 of the next bag to be produced. If the end stop

inserter 33 is not provided, the end stops 31, 32 may be developed at the cut-off device 52.

Figure 1 also depicts a weakening device 60 that is provided after the longitudinal film edges 40, 42 are aligned. The weakening device 60 is a device that can score, 5 dimple, or perforate the packaging film 12 on areas of the lengthwise fold in machine direction 61. Such a weakening device that would perform one or some of these weakening methods creates a weakness area 62 (as shown in Figure 4). The weakness area 62 allows an ease of opening of the ultimate package. As shown in Figures 3 and 5, alternate weakness areas 63 and 64 can be created by the weakening device 60. The 10 weakness areas 63 and 64 would allow removal of the top loop of the completed bag 55 upon tearing of the weakness areas.

In conjunction with the weakening device 60, the cut-off device 52 may be provided with a cutting lip to create a notch 66 to facilitate removing the film along the weakness areas 63, 64 or to create an aperture 68 in the package to expose the slider 32. 15 A sectional view of the completed bag 55 is depicted in Figures 4 and 5, with the alternative 3-sided sealing arrangement shown.

Modifications to the above would be obvious to those of ordinary skill in the art, yet the modifications would not bring the invention so modified beyond the scope of the appended claims.